

**120V NPN DARLINGTON TRANSISTOR IN SOT223**

**Features**

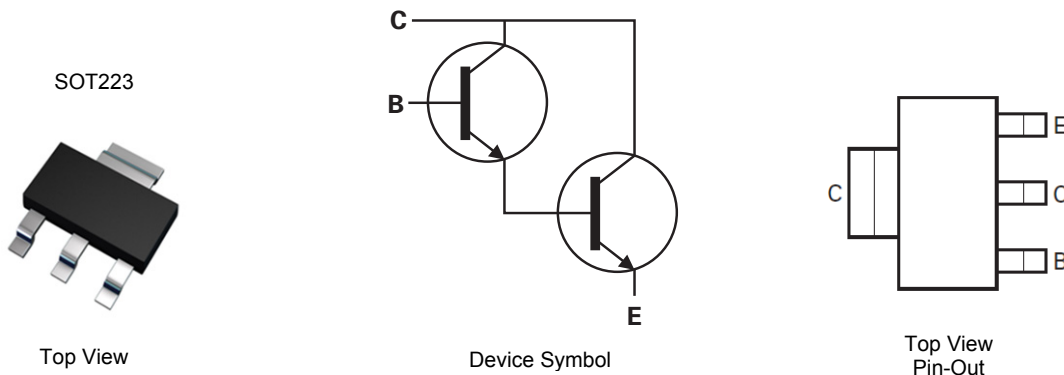
- $BV_{CEO} > 120V$
- $BV_{CBO} > 140V$
- $I_C = 1.5A$  High Continuous current
- $hFE > 2k$  for High Gain @ 1A
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: SOT223
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.112 grams (approximate)

**Applications**

- Lamp
- Relay
- Solenoid Driving

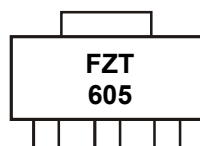


**Ordering Information** (Note 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
FZT605TA	FZT605	7	12	1,000
FZT605TC	FZT605	13	12	4,000

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**



FZT605= Product Type Marking Code

### Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	140	V
Collector-Emitter Voltage	V <sub>CEO</sub>	120	V
Emitter-Base Voltage	V <sub>EBO</sub>	14	V
Continuous Collector Current	I <sub>C</sub>	1.5	A
Peak Pulse Current	I <sub>CM</sub>	4	A

### Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

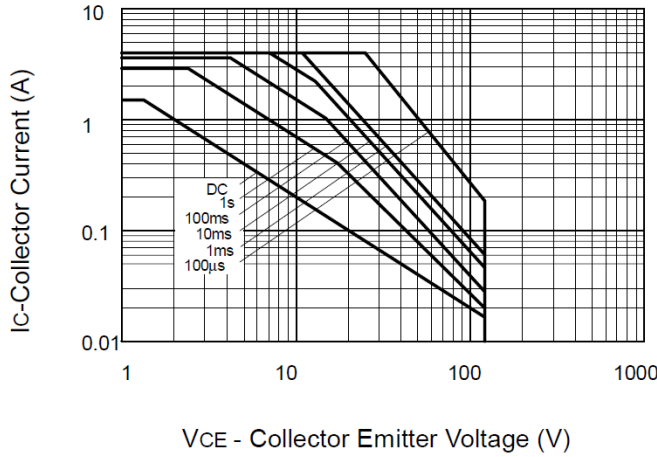
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5) 2	W
		(Note 6) 3	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 62.5	°C/W
		(Note 6) 41.7	°C/W
Thermal Resistance, Junction to Leads	R <sub>θJL</sub>	12.93	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 8)

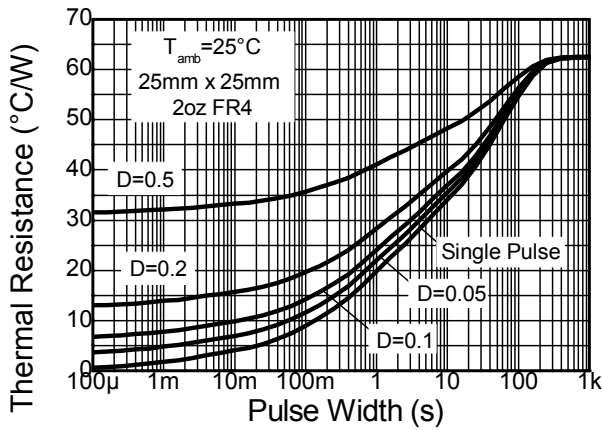
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	≥ 400	V	C

- Notes:
5. For a device mounted on 25mm X 25mm 1oz weight copper that is on a single-sided FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as note (5), except the device is mounted on 50mm X 50mm 2oz copper.
  7. Thermal resistance from junction to solder-point (at the end of the collector lead).
  8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

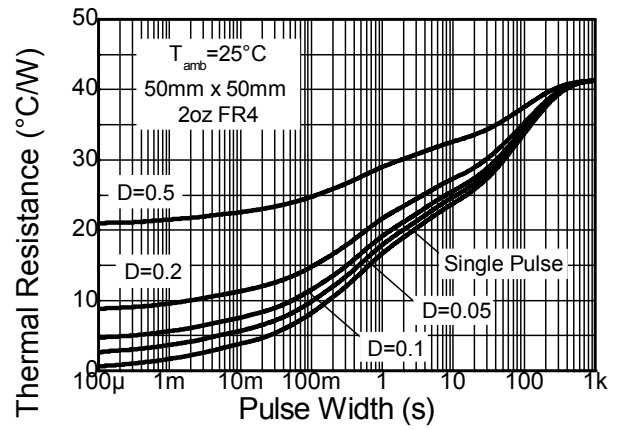
**Thermal Characteristics and Derating Information**



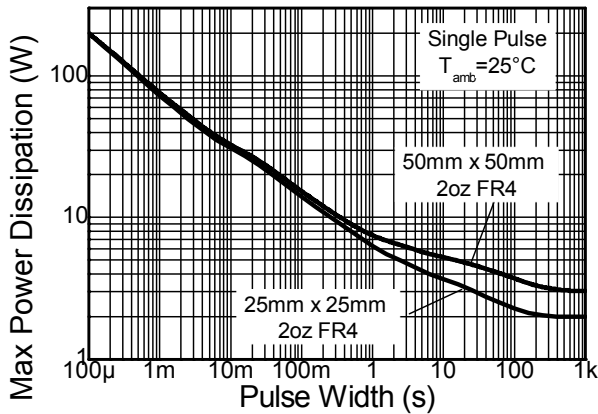
**FZT605 Safe Operating Area**



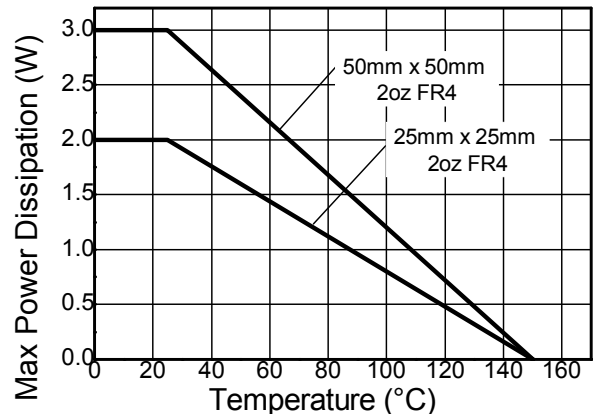
**Transient Thermal Impedance**



**Transient Thermal Impedance**



**Pulse Power Dissipation**



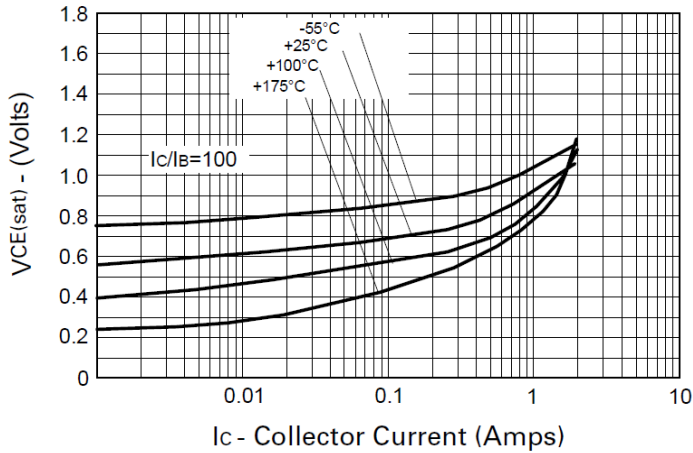
**Derating Curve**

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

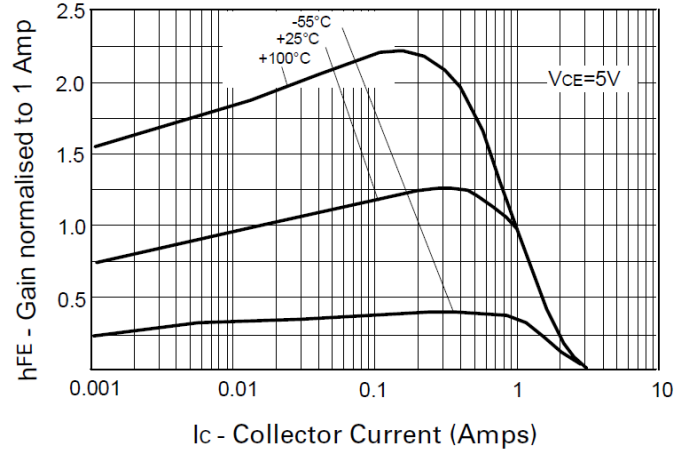
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	140	—	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	120	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	14	—	—	V	$I_E = 100\mu\text{A}$
Collector-Base Cutoff Current	$I_{CBO}$	-	—	100 10	nA $\mu\text{A}$	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}, T_A = +120^\circ\text{C}$
Collector-Emitter Cutoff Current	$I_{CES}$	-	—	100	nA	$V_{CE} = 120\text{V}$
Emitter Cutoff Current	$I_{EBO}$	-	—	100	nA	$V_{EB} = 8\text{V}$
DC Current Gain (Note 9)	$h_{FE}$	2,000 5,000 2,000 500	— — — —	— — 100,000 —	—	$I_C = 50\text{mA}, V_{CE} = 5\text{V}$ $I_C = 500\text{mA}, V_{CE} = 5\text{V}$ $I_C = 1\text{A}, V_{CE} = 5\text{V}$ $I_C = 2\text{A}, V_{CE} = 5\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	— —	— —	1 1.5	V	$I_C = 250\text{mA}, I_B = 0.25\text{mA}$ $I_C = 1\text{A}, I_B = 1\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	—	1.8	V	$I_C = 1\text{A}, I_B = 1\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	—	1.7	V	$I_C = 1\text{A}, V_{CE} = 5\text{V}$
Input Capacitance (Note 9)	$C_{ibo}$	—	90	—	pF	$V_{EB} = 0.5\text{V}, f = 1\text{MHz}$
Output Capacitance (Note 9)	$C_{obo}$	—	15	—	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$
Current Gain-Bandwidth Product (Note 9)	$f_T$	150	—	—	MHz	$V_{CE} = 10\text{V}, I_C = 100\text{mA}, f = 20\text{MHz}$
Turn-On Time	$t_{on}$	—	0.5	—	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_C = 500\text{mA}$
Turn-Off Time	$t_{off}$	—	1.6	—	$\mu\text{s}$	$I_{B1} = -I_{B2} = 0.5\text{mA}$

Note: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

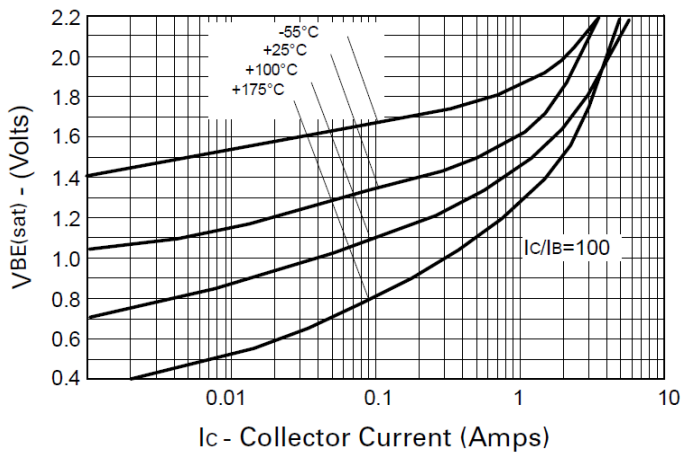
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



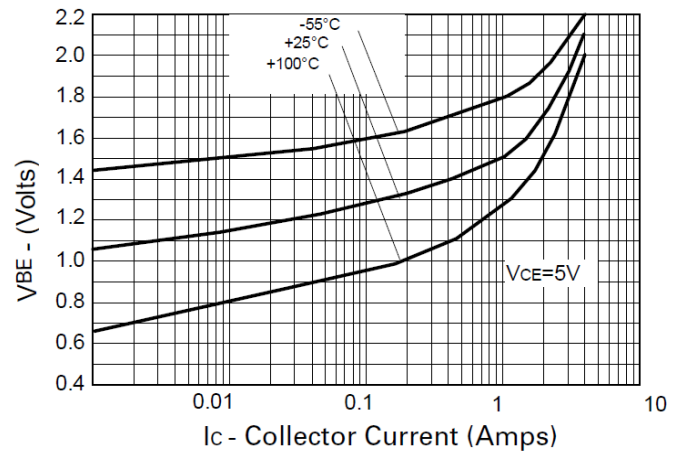
**$V_{CE(sat)}$  v  $I_C$**



**$h_{FE}$  v  $I_C$**



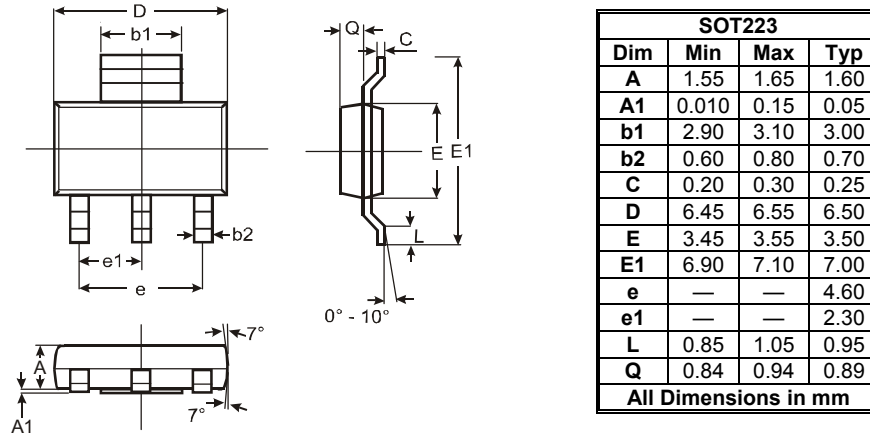
**$V_{BE(sat)}$  v  $I_C$**



**$V_{BE(on)}$  v  $I_C$**

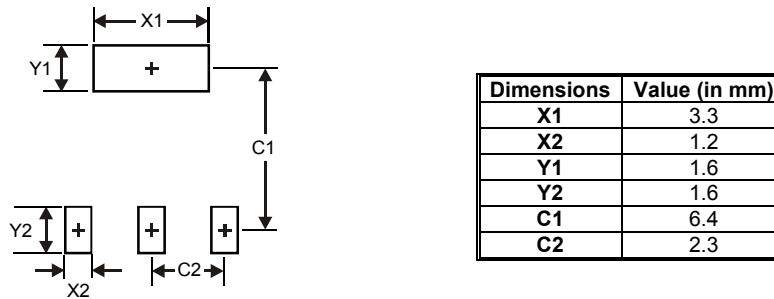
## Package Outline Dimensions

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device terminals and PCB tracking.

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